THE ELECTROCHEMICAL PROPERTIES OF COMPOSITE POLYMERIC GEL ELECTROLYTES REINFORCED WITH GLASS-FIBRE CLOTH FOR Li-ion BATTERY

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SiO_2 effect on the electrochemical properties of composite polymeric gel electrolytes(PGEs) reinforced with glass fiber cloth(GFC) was investigated[1]. PGEs were composed of polyacrylronitrile (PAN), poly(vinylidenefluoride-co-hexafluoropropylene) (P(VdF-co-HFP)), $LiClO_4$ and three kind of plasticizer(ethylene carbonate, dietyl carbonate, propylene carbonate). SiO_2 was added to PGEs in the weight fraction of 10, 20, 30% respectively.

PGEs containing SiO_2 showed conductivity of over 10^{-3} S/cm at 23□ and electrochemical stability window to 4.8V. In the impedance spectra of the cells, which were constructed by lithium metals as electrodes, interfacial resistance increased due to growth of passivation layer during storage time and remarkable difference was not observed with content of SiO_2. In the impedance spectra of the lithium ion polymer batteries consisted of $LiCoO_2$ and mesophase pitch-based carbon fiber(MCF), ohmic cell resistance of SiO_2-free PGE was changed continuously with number of cycle, but those of SiO_2-dispersed PGEs were not. Discharge capacity of the PGE containing 20wt% SiO_2 showed 132 mAh/g at 0.2C rate and 85% of discharge capacity was retained at 2C rate.

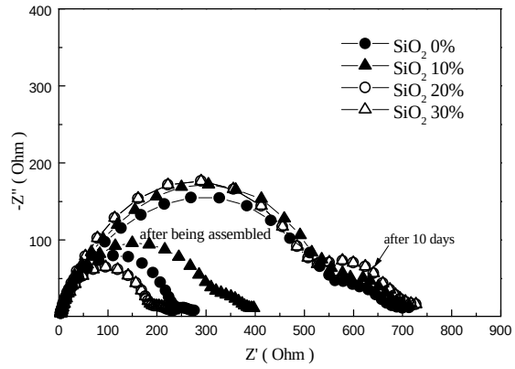

Fig. 1. Impedance spectra of SiO_2-dispersed GFC/PGEs as a function of the content of SiO_2. The electrode area is 1 cm^2.

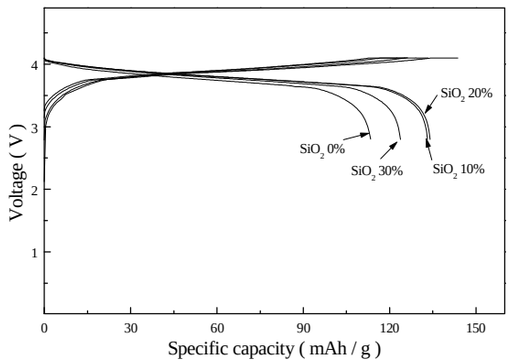

Fig. 2. Charge/discharge profiles of Li-ion batteries at 0.2C rate.

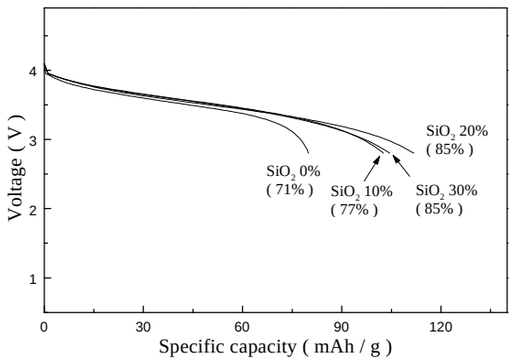

Fig. 3. Discharge profiles of Li-ion polymer batteries at 2C rate.

Acknowledgement

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References

1. H.C. Park, J.H. Han, S.H. Kim, S.I. Jo, J.S. Chung, H.J. Sohn, and J.M. Ko *J. of Power Source*, 92/1-2, 272-276(2001).